- Confidence Interval:
  - "We" make estimates and conclusions about populations from some sample or set of samples.
  - Margin of error → how far off our estimate from a sample is related to the population
  - Use normal model with sampling distribution to create a sampling model
  - We can estimate the standard deviation of a sampling distribution, which is called standard error

$$SE(\hat{p}) = \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

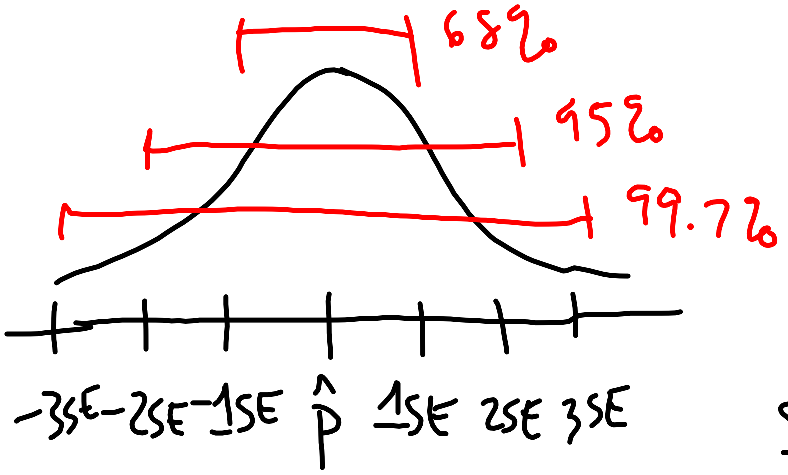
SE( ) → standard error

$\hat{p}$ → sample-based estimate of true proportion (p), probability of "success"

$\hat{q}$ → probability of "failure" $(1-\hat{p})$

- Confidence Interval Statements:
  - Example:
    - "We are 95% confident that between 42.1% and 61.7% of Las Redes sea fans are infected."
  - Form:
    - "We are 95% confident that between $\hat{p}-2SE$% and $\hat{p}+2SE$% of ____ the rest of what you're discussing."

(typically, can be others)



$$SE(\hat{p}) = \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

- Formal Definition for 95% Confidence Interval:
  - When the sampled values are independent and the sample size is large enough, we can be 95% confident that the interval $\hat{p} \pm 2SE(\hat{p})$ captures the true population proportion p.

- Calculator:

  STAT → TESTS → A: 1-PropZInt

  1-PropZInt

  x : count of successes

  n : total number in sample

  c-level : confidence interval (almost always 0.95)

  Calculator then shows...

  ($-2SE$ lower percentage , $+2SE$ upper percentage)

  $\hat{p}$ = center of sampling model

  n = repeated for your input

  Full answer: $\hat{p} \pm 2SE$

  sea fans: 52% ± 10%

  to find 2SE, use $+2SE - \hat{p}$